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## FOSSIL HUMAN REMAINS FOUND NEAR LANSING, KANSAS

By W. H. HOLMES

The fossil remains of two human beings were discovered while digging a cellar-tunnel for the storage of fruit on the farm of Mr Martin Concannon, near Lansing, Kansas, in February, 1902. During the past summer the site was visited by a number of geologists, archeologists, and others interested in the history and antiquity of man in America, and already several more or less elaborate accounts of the discovery have been published in our scientific journals. The last and by far the most critical study is that of Prof. T. C. Chamberlin, which appeared in the *Journal of Geology* for October and November, 1902. Other papers are by Prof. S. W. Williston (*Science*, August 1), Mr Warren Upham (*Science*, August 29, also *American Geologist*, September), and Prof. N. H. Winchell (*American Geologist*, September).

I had the good fortune to accompany Professor Chamberlin on his first visit to the site, and to meet there also Prof. R. D. Salisbury, Prof. Samuel Calvin, Dr Erasmus Haworth, Dr George A. Dorsey, and Mr M. C. Long. Careful examinations were made of the tunnel and of the geological formations in the vicinity, as well as of the cranium preserved in the Kansas City Museum, and it was found that the accounts of the discovery previously published were essentially correct in every important particular. The human remains consist of a skull and a number of the larger bones of an adult man, and the lower jaw of a child of some ten years.

Owing to the difficulty of studying the formations in the tunnel, already well filled with farm products at the time of our visit, the idea of making additional excavations was suggested, and

through the kind offices of Mr Long it was arranged with Mr Concannon that the Bureau of American Ethnology should undertake this work. Mr Gerard Fowke, who, under my supervision, had been conducting researches in the well-known fossil bone-beds of Kimmswick, Missouri, was called in, and during the month of October a trench was opened into the relic-bearing deposits from the west at right angles to the tunnel dug by the Concannons, exposing the full depth of the deposits for a horizontal distance of about forty feet. Beside this the main cellar-tunnel was carried some twelve feet farther, and a chamber was excavated on the east side of the tunnel, opposite the point where the remains of the man were found. When this work was completed Professor Chamberlin joined me in a second visit to the site, and examinations of all the phenomena were made under the most favorable conditions.

In the following brief summary I rely for geological interpretations largely on the views of Professor Chamberlin, whose mastery of the intricate problems of glacial and post-glacial geology is everywhere acknowledged.

The remains were found beneath twenty feet of undisturbed deposits forming a little bench on which the Concannon dwelling stands. The child's jaw was encountered about sixty feet from the entrance of the tunnel, and the skull of the man ten feet farther in. There can be no doubt of the correctness of these observations.

The skull is well preserved, and corresponds closely in type with crania of the historic Indians of the general region. It presents no unique features and offers no suggestion of great age or of inferior organization. Front and back views are presented in plate XXXI, and profile and top views in plate XXXII. Its characteristics are briefly summarized by Dr Dorsey, as follows:

The specimen, after such reparation as has been possible, lacks all the bones of the face and small portions of the occipital, temporal, and frontal bones; hence no observations are possible on the face or base of the skull.

The bones are firm, hard, and comparatively thin. The sutures are normally serrated; the coronal and anterior half of the sagittal sutures are only very slightly serrated; lambdoidal and posterior half of the sagittal are moderately serrated.

From above the skull is pentagonal in form, with bulging parietals and narrow occiput. The glabella is only fairly prominent; the supra-orbital ridges near the glabella are well marked. The forehead retreats gradually and is uniformly convex. The vault reaches a considerable height and retreats rapidly to near inion. The occipital region bulges decidedly.

The temporal lines are fairly well marked, but not pronounced, and extend slightly above the middle of the parietals. The mastoids, though much damaged, were evidently not pronounced. The occipital ridges and depressions are exceedingly faint.

The skull is of an individual probably from forty to fifty years of age, and, I am inclined to believe, that of a male, although the male characters are not at all pronounced. In its general shape the skull bears a striking resemblance to the crania of the Plains Indians, for example, the Blackfoot. Its measurements are as follows:

Maximum length.....	188 mm.
Maximum breadth.....	138 mm.
Cephalic index.....	73.

The only question likely to give rise to serious discussion is that of the age of the formations with which the remains were associated, and to this point I shall give chief attention. The bench occupied by the Concannon dwelling is squarish in outline, having a horizontal extent of about 150 feet from east to west and perhaps 160 feet from north to south, and its highest point is about thirty feet above the present flood-plain of the river (see figure 29). It rests against the base of a limestone spur of the river bluff, on the south side of a little valley that opens out into the river bottom at this point. The upper surface of the bench slopes away at a low angle from its junction with the limestone spur (*a*). Facing the river it presents a steep slope continuous with the face of the river bluff. On the north it descends abruptly to the bed of the rivulet, and on the west the slope is somewhat gentle to the small lateral valley on that side.

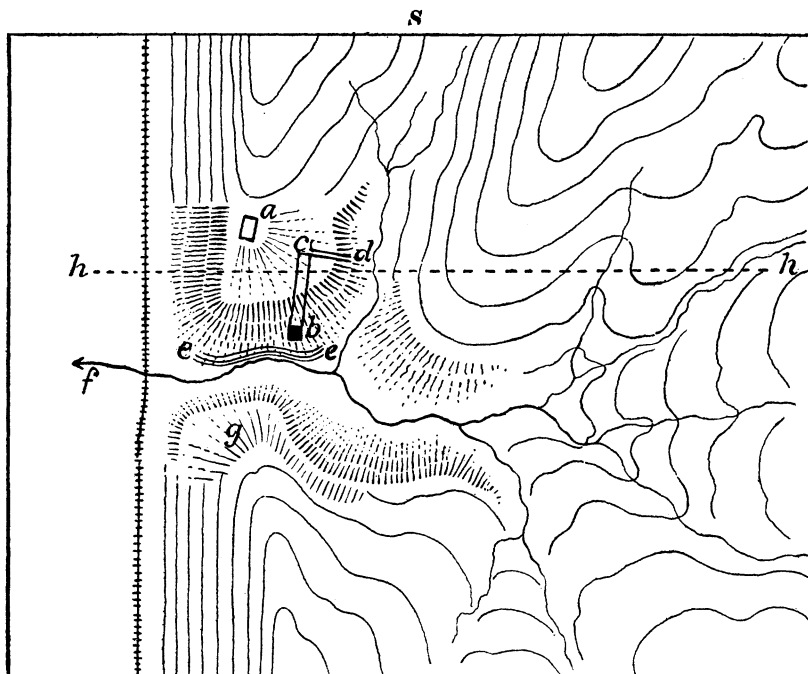


FIG. 28.—Sketch map of the Lansing site, indicating recent bench remnants in hachures. (*a*, Con-cannon dwelling and point of contact of limestone river bluff and recent bench. *b*, Entrance to cellar-tunnel. *c*, Inner end of tunnel where skull was found. *d*, Trench opened by Bureau of American Ethnology. *e-e*, Outcrop of limestone in rivulet bed. *f*, Entrance of rivulet to Missouri river flood-plain. *g*, Contact of limestone spur and bench remnant on north side. *h-h*, Line of section, fig. 29.)

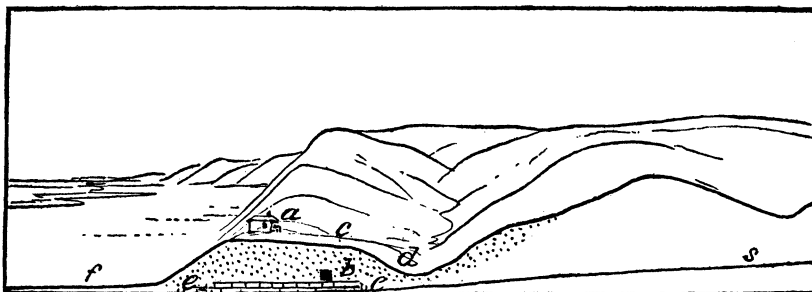


FIG. 29.—Section of the Lansing site showing bluffs and river beyond, looking south. (*a*, Con-cannon dwelling and point of contact of limestone river bluff and recent bench. *b*, Entrance to cellar-tunnel. *c*, Inner end of tunnel where skull was found. *d*, Trench opened by Bureau of American Ethnology. *e-e*, Outcrop of limestone in rivulet bed. *f*, Entrance of rivulet to Missouri river flood-plain. *s*, Grade of stream bed.)

The cellar-tunnel enters the north face of the bench near the base (*b*, figures 28 and 29). The skull was found at *c*, 70 feet from the entrance, 20 feet from the upper surface of the terrace, and about 18 inches above the floor of the tunnel. The lateral trench is indicated at *d* in both illustrations.

The deposits composing the bench, so far as exposed, rest on the nearly level surface of a stratum of carboniferous limestone (*e-e*), and the tunnel is dug so that this surface forms its floor. The deposits are believed by some to be true alluvial loess, derived directly from the ice front in the valleys above; they would thus represent one of the glacial stages. Others regard them as consisting of finely comminuted material derived from the loess beds of the neighboring slopes, and of other coarser materials from the hillsides, spread out in comparatively recent times by local agencies in and about the entrance to the little valley. The first of these views has been adopted by Prof. S. W. Williston, Mr Warren Upham, and Prof. N. H. Winchell; and the second is held by Prof. T. C. Chamberlin, Prof. R. D. Salisbury, and Dr Samuel Calvin. I am inclined to favor this latter view, not only because it appears to be sustained by the geological evidence, but because it is in harmony with what we already know of the history of man in America. The skull corresponds in type with crania of the historic occupants of the region,—the Indian tribes,—which fact carries with it, according to the view of some biologists, a presumption against its great antiquity; and again, there is as yet no substantial and unequivocal evidence that men of any race existed in America during the glacial period.

The geological features of the site, in so far as they relate to the question of human occupancy, may be briefly reviewed and their interpretation may be presented in the same connection. The first step in the history of the site requiring attention is the exposure or partial exposure of the nearly level limestone floor on which the materials of the Concannon bench were afterward deposited. This probably took place when the river channel

curved sharply in against the bluffs at this point, permitting the currents to break down and partially remove the superior beds of shale and limestone well within the entrance to the little valley. When this active erosion ceased, the limestone surface was strewn with rocky *débris* a foot or two deep, and in against the bluff at the southern margin there were heaps of coarse talus material upon which the two human bodies were cast or in which they were rudely buried; and just here we reach the point of divergence of the two interpretations with respect to the period at which these events occurred. The first view assumes that we are probably dealing with the Iowan epoch of the glacial period. If this is correct, the events following the deposition of the bodies would be about as follows: During this period the river, becoming burdened with silt from the receding ice front, buried the bodies and began to fill up its channel. Step by step the surface rose until the immediate valley was filled and obliterated, and the waters flowed out over the highest bluffs, depositing everywhere the mantle of silt known to geologists as loess. As the ice receded to the far north, deposition gradually ceased in this part of the valley, and the river, step by step, cut its way down again through the vast deposits that filled its former channel, leaving a succession of loess terraces, more or less well defined against the hill-sides, and finally, after many fluctuations, reaching its present level, which at extreme high water is from five to ten feet lower than our datum level—the limestone floor indicated at *e-e*, figure 29.

But are we warranted in supposing that the two human bodies became associated with the *débris* on the limestone floor during this great epoch in glacial history, or are we to adopt the opposing view that at the end of this episode, or long after its close, when the river had descended to nearly its present level, the floods uncovered the limestone surface within the entrance to the little valley, and that at this time the aborigines, doubtless the ancestors of our historic tribes, left their dead among the heaps of *débris*?

The latter view assumes that the river probably had little to

do directly with depositing the materials that buried the human bodies and now form the Concannon bench; that after clearing the limestone floor the current probably followed its habit of rapid change and shifted for a time to the eastern side of the broad flood-plain, leaving other agencies to control the destinies of the little valley now occupied by the Concannon farm. Naturally the deposits of the bench have been examined with minutest care with the view of determining the story of their accumulation. If laid down in water they should show decided evidence of assortment and bedding; if the result of redistribution of loess and other local materials through surface agencies, the deposits would present little evidence of assortment and no evidence of systematic stratification. Throughout the entire depth of these formations, as exposed in the tunnel and in the trench, there appears to be but one feature that can be construed as giving decided support to the view which favors fluvial origin. A thin seam of clay appears in the west wall of the tunnel, some three feet above the limestone floor, and extends from the entrance far back toward the south, rising at a low angle. The earlier examinations of this deposit led to the conclusion that the lower part, at least, of the formation had been laid down by the river, but subsequent investigations show that the layer is not continuous, that it is not found in the east wall of the tunnel opposite its appearance on the west side, and that it pinches out quickly to the west, no trace of it having been discovered in the walls of the great trench dug by the Bureau. It is just such a layer of water-laid clay as would accumulate in the bed of a sluggish stream running with the trend of the tunnel at this point, or through the presence of a small oblong pool of water left during a season of flood before the river finally deserted this level.

The deposit is composed for the most part of loess-like silt, through which, at all levels, are scattered fragments of limestone and shale, the whole presenting much variety of composition and irregularity of accumulation; hence it is surmised that the



history of its deposition may be somewhat as follows: When at a period indefinitely later than the close of the Iowan epoch, and possibly much later than even the close of the glacial period, the river retreated from the west side of the valley, leaving the limestone floor at the entrance to the little valley freshly exposed, the steep slopes of the valley, half a square mile in area, were mantled with loess deposits, and these, with coarser materials from the general surface, were carried down by creep and wash to the gateway of the little valley where, since active erosion by the river had ceased, they accumulated, burying the exposed rock surface and the human remains to a depth of twenty feet or more and spreading out in a fan-shaped delta on the river flood-plain about the mouth of the valley. The narrow entrance to the valley probably favored accumulation, and the weak intermittent rivulet must have been quite incapable of clearing the way and carrying the accumulated material far out over the plain to the river channel. At any rate it seems altogether reasonable to suppose that twenty feet or more in depth of this material could have been deposited within and about the entrance to the little valley. The amount of accumulation would be limited only by the length of time that the river channel remained far away to the east and by the supply of easily eroded material. It is readily understood, however, that between the period of the burial of the human bodies and the present time the river may have returned once or several times toward the west bluff, permitting active work in undermining and cutting down the limestone face. That it did return is strongly suggested by the apparent recentness of the cutting and the fact that the Concannon bench, the surface of which was at one time continuous with the flood-plain surface, is truncated on the face uniformly with the main bluff. This return of the channel to the west side would give the little stream the opportunity of lowering its channel to the present perfect adjustment with the river, and especially so since, as the centuries passed, the loess deposits had

been largely removed from the slopes of the valley above and rapid accumulation about its mouth by creep and wash had necessarily ceased.

The preferred interpretation of the phenomena, then, is that the relic-bearing deposits of the Concannon bench were not laid down in glacial times by the silt-charged waters of the Missouri, but that they are a remnant of delta-like accumulations formed in comparatively recent times within and about the mouth of the tributary valley by local sub-aërial agencies, all save the more protected portions having been removed by late encroachments of the ever-changing river.

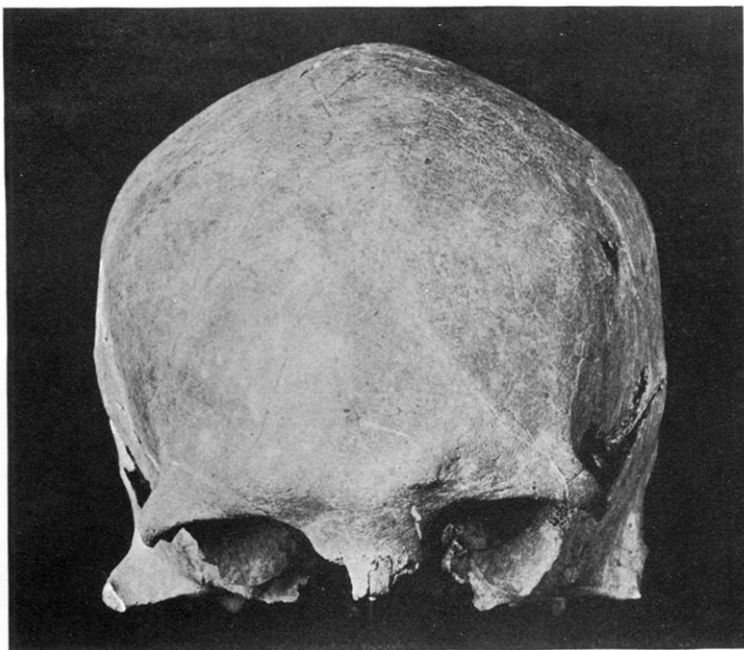
The time involved would not be that required by the Missouri to lower its flood-plain from the upper level of the bench to the present high-water mark, a descent of thirty or thirty-five feet, but the period required to depress the flood-plain from a little above the surface of the limestone floor on which the bodies rested to its present level, a descent of from five to ten feet. The measure of this amount of erosion in years is the measure of the age of the Lansing man ; this may be thousands of years, but at most it can be but a fraction of the time required by the other view ; for, according to that view, the river, after burying the human bodies, filled its channel with glacial deposits until it overflowed the highest bluffs, and then descended again to the present level. The time required to fill up the valley, three or more miles in width and nearly two hundred feet in depth, and then to cut this filling all out again can never be determined, since chronologic criteria are largely wanting ; but it might well reach ten, twenty, or even thirty thousand years. On the other hand, the time required by the river to lower its bed five or ten feet might possibly be expressed in hundreds rather than in thousands of years. It may be of importance to note, however, that even this amount of lowering need not be assumed in accounting for the facts. The high-water mark today along the Concannon bluff, with the river a mile or two away across a wooded plain,

might well be several feet lower than the highest level reached by a strong current driven directly or even obliquely against the bluff.

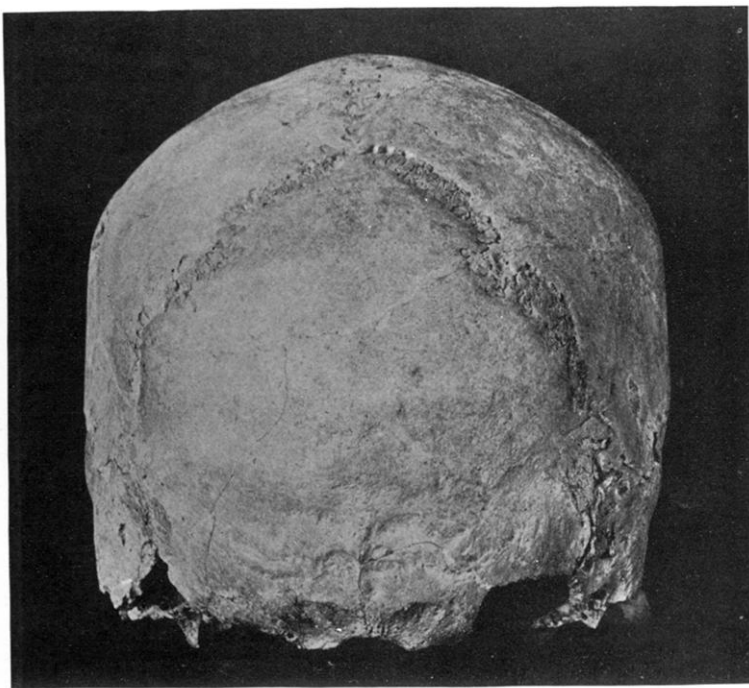
The anthropologist may readily find other than purely geological criteria to aid him in reaching his conclusions. It is a part of our common knowledge that men have occupied the American continent for a long period, but that they occupied it during the glacial epoch, or even at the period when the glacial front finally receded northward, is not demonstrated. Besides, as already mentioned, the cranium is well preserved and fresh-looking, and is nearly identical with crania of our historic tribes. Now when, as in the present case, two somewhat equally supported interpretations of the geological phenomena are possible, — the one making it appear that remains of men occur in formations where they could reasonably be expected, and the other carrying human occupancy back ten thousand or twenty thousand years,—the anthropologist may consistently accept, tentatively at least, the first of these interpretations, and the non-professional student of the subject may find it wise to at least withhold his full acceptance of either view until those geologists best qualified to discuss the special problems involved shall have reached practical unanimity.

As a result of my own observations at Lansing, and considering also the conclusions reached by Professor Chamberlin and his associates, I find it difficult to come to any other conclusion than that the human remains under consideration are properly classed as of post-glacial age, interpreting that term to cover all time subsequent to the final retreat of the ice from the region south of the Great Lakes.

The Lansing skull, illustrated in plates XXXI-XXXII, belongs to Mr M. C. Long, curator of the Kansas City Museum. It has been carefully repaired under the direction of Dr George A. Dorsey and is now deposited in the United States National Museum.

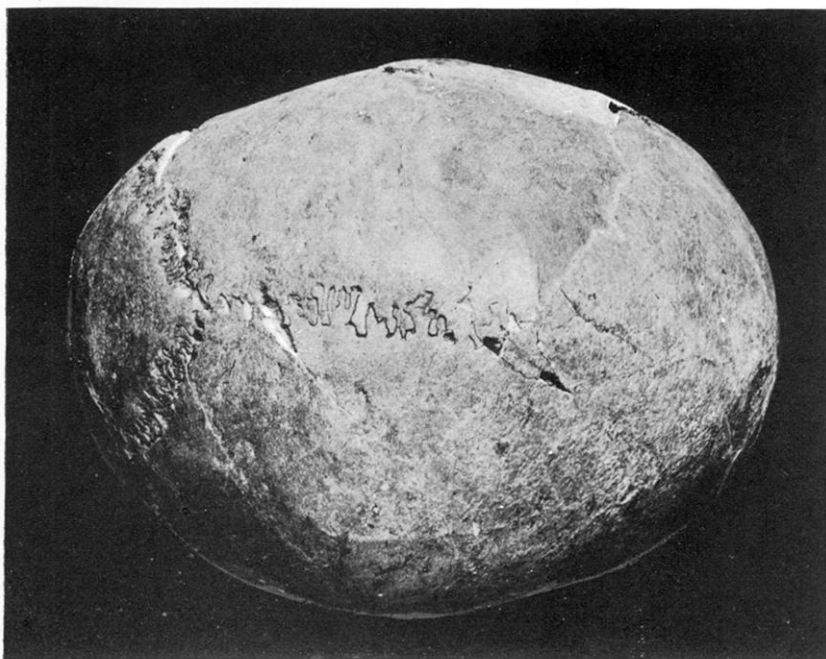


*a*



*b*

THE LANSING SKULL (FRONT AND BACK VIEWS.)



*d*

THE LANSING SKULL. (SIDE AND TOP VIEWS.)